

mere symbols. The analytical working out of problems is given with unusual fulness. On the whole this is a distinct advantage to the beginner, though in some cases it has been a little overdone, as, for instance, on pages 190-193, where more than 2½ pages are devoted to the analytical work of a triple integration. Each chapter contains several examples fully worked out, and concludes with a number of exercises to which the answers are appended.

The arrangement of the book is good, but the section dealing with real and imaginary quantities early in the book, and that on the hyperbolic functions towards the end, might have been omitted without much real loss to the beginner, and certainly the former section is introduced too early.

A mistake occurs on page 101 in reference to an application to alternating electrical currents. The arithmetical average has been confused with the square root of mean square, with the result that the statement made is incorrect.

Engineering Chemistry. A manual of Quantitative Chemical Analysis for the use of Students, Chemists and Engineers. Second Edition. By Thomas B. Stillman. Pp. 503. (Easton, Pa.: The Chemical Publishing Co., 1900.)

THIS work is intended to be placed in the hands of the student who is commencing quantitative analysis, and hence the first eleven exercises deal with general elementary determinations, after which he will take up that portion of the book which deals with his special requirements. Schemes are then given for the analysis of coal and coke, iron ores, water, both for sanitary and technical purposes, of coal, oil, producer and flue gases, iron and steel, cement, building materials, paper, soap, lubricating oils, paint and asphalt. On account of the wide scope of the book, the author has secured special articles from experts on blast furnace practice, boiler tests, carbon compounds of iron, practical photometry, electrical units and energy equivalents. As must necessarily be the case from the size of the book and the variety of subjects dealt with, the work is written in a very compressed style throughout, so much so, in fact, that it is scarcely a suitable work to put in the hands of "students commencing quantitative analysis." The large amount of practical information in it, however, will render it a useful work of reference for chemists engaged in engineering work. In some respects there is room for improvement. The superabundance of decimal places in numerical results, which is, unfortunately, characteristic of American technical literature, is very much in evidence. Thus in an analysis of water for technical purposes, the constituents of which, on account of their minuteness, are weighed with an accuracy of about two, or at the most three, significant figures, in the final statement of results no less than five places are given. An even more striking case is in the section on calorimetry, in which the water equivalent of a calorimeter is laboriously worked out to six significant figures, 203.460, the experimental result being casually given as 227.22. Another example is in the determination of the heating value of a gas, the result being expressed as 10726.7 B.T.U. per pound. The section on photometry is somewhat out of date, no mention being made of any standard of light other than the sperm candle. The chapter on pyrometry and many of the numerical data also require bringing up to date, many of the tables and calculations being based upon the weight of a litre of hydrogen taken as 0.08958. A noteworthy feature, and one adding considerably to the value of the book, is the introduction of a short bibliography at the end of each special chapter. It is curious to note that in some cases recent papers of importance are given as references, but ignored in the text. This is especially noticeable in the chapter on pyrometry.

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LETTERS TO THE EDITOR.

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Darwinism and Statecraft.

EVERY one who is interested in the bearing which the teaching of biology has to the affairs of the nation must have followed with interest not only this last work of Prof. Pearson, but also his many contributions to the subject of heredity. Very opportune, also, is Prof. Lankester's appeal in his review (March 21) to "the greatest in the land," for apart from the fact "that the crowd cannot guide itself in its blind impotence," it is being otherwise led by the hysterical nonsense of a halfpenny Press that is degrading journalism and the people by the substitution of bombastic ignorance and assertiveness for knowledge and real merit.

It seems to me that the statement in Prof. Pearson's book of what the British parent ought to say is just what he should not say, and that the implication in Prof. Perry's review that the development of the faculties ought to begin at the public schools is open to objection because such beginning can and ought to be made very much earlier. The statement which Prof. Pearson would have the parent say would be better if it were altered so that for "son" we should read "children," for surely we require thinking and observing daughters as well as sons; and, moreover, the statement seems to imply that the parent expects the public school or the University to teach his son to think and observe, whereas, if the parent did his duty, the most that he ought to expect of these institutions would be the further development of his children's thinking and observing powers, and not their initiation in these matters.

We need thinking men, it is true; but what is the nature and source of the early influences that makes or mars their careers before they will be brought into contact with the educational system that is to make them thinkers? Are we not on the wrong track when we talk of "making thinkers" or of "training men to think"? Remembering the nature of the child, rather it seems to me that we should be nearer a successful issue if we turned our energies in the direction of retaining and developing the thinking powers it naturally possesses. Any one who chooses to observe the development of a child's mind will, if he does not suppress its natural bent, convince himself that a child from three to five years of age possesses thinking powers of greater capacity than we are in the habit of crediting to it. One of the external evidences of a thoughtful mind is the asking of questions which bear definite and logical relations to each other; and this is precisely what an average child of that age, when talking to a person in sympathy with it, is persistently doing. It is not content with a flimsy and evasive answer, and how strong is its intellectual craving is manifested by its evident disappointment or display of temper when its ignorant parents impatiently curb its curiosity. It is very seldom that one finds a mother who has endeavoured to retain her child's thinking capacities. I was once present when the four-year-old little daughter of such a mother was making inquiries about the planet Venus, and after she had been informed that both Venus and the earth travelled round the sun and were illuminated by it she put the query, "Then if there were people on Venus our earth would look to them like Venus looks to us?" This question demonstrates that a child possesses thinking powers sufficiently vigorous to enable it to see the logical relationships of bodies to each other that would certainly do credit to many of its superiors in point of years. This is not an isolated instance, and my impression, derived from observation and from conversation with observant persons, is that the average child, if not suppressed, is capable of a quality of thinking that leads its elders, when they try to follow it, into an intellectual quagmire of inconsistency and absurdity from which they beat an inglorious retreat by angrily bidding it "not to ask silly questions." If they bid themselves not to give silly answers their request would be just. Let me give an instance of the intellectual stagnation upon which the children who will become the nation's men are being reared. I once heard a child ask its mother, "What makes the flowers grow?" Promptly came the answer, "Jesus!" No wonder when children's intellects are muddled with such unprovable assertions that they cease to think. I recall my

own younger days, and the questions I wanted answered: they were answered negatively as a rule, and those that were positively so never allowed me to reconcile them with the facts around me, and I have since learned that they were mostly perversions of the truth, designed to secure a theological end. Little wonder I ceased to think by the time I got to school, and it is a matter of surprise to me that the examination system which followed did not convert a state of abeyance into one of absolute destruction.

There is no need to "make" thinking men; they are born to us if we will but retain, develop and strengthen the qualities that every healthy average child possesses. But to do this we want, above all else, thoughtful, intelligent and well-informed women who, as mothers, will recognise their duties to the State and will endeavour to retain and train the natural qualities, physical and intellectual alike, of the children that are to become the nation's men and women. The old style of domestic wife and mother—an uninteresting, mechanical drudge or a gaudy doll—may have been good enough for our forefathers, but for us it means loss of national time and energy which, if utilised, can be converted into factors capable of retaining the supreme position that we are fast losing. Granting that the results of a mother's pernicious training can be remedied in later life, it is obviously waste of valuable energy, time and money to organise an elaborate system of education to undo that which ought never to have been done. And, therefore, I urge that our national progress depends very largely upon "the hand that rocks the cradle": if it rocks that with an intelligent purpose, it will be well with our future men; if not, then England, like Tyre, Venice and Rome, "whose greatness it has inherited," "must be led, through prouder eminence, to less pitted destruction."

G. P. MUDGE.

THE ROYAL LIBRARY AT NINEVEH.¹

OUR readers who are in the position of being able to recall the "discovery" of Nineveh, which was announced between the years 1845 and 1854, will have no difficulty in remembering that the exhuming of colossal bulls and bas-reliefs from the site of the palace of the great kings of Nineveh was almost contemporaneous with the discovery of the means whereby the wedge-shaped characters, which were found cut upon them in long, symmetrical lines, could be read and understood. It was a coincidence of the most remarkable kind that the excavations at Nineveh yielded at that time such a large mass of new material for Rawlinson, Norris and Hincks to work upon, and it may be safely said that the correct information concerning Bible history which they succeeded in producing from it convinced the general public of the trustworthiness of Rawlinson's system of decipherment more effectually than his epoch-making translation of the inscription of Darius the Great, which was cut on the face of the now famous rock of Behistun, would ever have done. The bulls and colossal figures and bas-reliefs, which Sir Henry Layard drew out of their hiding places, appealed strongly to the popular imagination, which already at that time saw in them the prototypes of the mysterious figures that the prophets of the Hebrew god Yahwe saw in their visions, but for the scientific seeker after the knowledge of the long-lost cuneiform language they did little. It was soon recognised that the texts engraved upon them contained many duplicates, and also that they did little more than set forth, in stereotyped and vaunting phrases, the names and titles which the kings of the Second Assyrian Empire arrogated to themselves. But further examination of the smaller objects which were found in the ruins of the Assyrian palace at Nineveh resulted in the discovery of a large collection of "tiles," as they were first called, made of baked clay, which were inscribed with texts written in cuneiform with minute characters, and this "find" is, for cuneiform decipherment, probably the

greatest which has ever been made. An investigation of these minutely written texts showed that they consisted of lists of cuneiform signs arranged on a definite plan, of lists of words and phrases, and of connected narratives, which might well come under the general description of "literature"; in fact, the thousands of tablets and fragments of tablets which had been sent home, without the least idea of their value having entered into the heads of those who found them, turned out to be neither more nor less than the fundamental matter upon which the whole of the great superstructure of Assyriology has been built. We now know of a certainty that, at the close of the eighth century before Christ, Sargon, king of Assyria, possessed a few tablets, the contents of which concerned the business of his kingdom, and that he kept these in a chamber in his palace. It seems also that his two successors, Sennacherib (B.C. 705–B.C. 681) and Esarhaddon (B.C. 681–B.C. 668), added other tablets to Sargon's, and that we may also regard the united collections of these great kings as the nucleus of the Royal Library at Nineveh.

The great literary king of Assyria was, however, Ashurbanipal, and it is to him that the world is indebted for whatever knowledge of the Assyrian and Sumerian language it possesses. This mighty hunter and warrior found time to take an interest in the welfare of the literature of his country, and he spared neither pains nor expense in the formation of his library and in making it to contain a truly representative collection of tablets. His interest was twofold, for he was anxious to preserve both the best works written in his own native Semitic language and those which had come down in a more or less fragmentary condition from the Sumerians, a mighty people who seem to have given to the Semitic inhabitants of Mesopotamia nearly all that they ever possessed in the way of literature. With this object in view he had copies of many of the great Sumerian literary compositions made, and to these he attached translations in Assyrian, arranged interlinearly, a fact which seems to indicate that the knowledge of Sumerian was disappearing from among his people when he began to reign. Literary compositions were, however, not the sole objects of his care, for he collected the materials necessary for learning and teaching both the Assyrian and Sumerian languages, and evidences of this are the important remains of the syllabaries, sign-lists, vocabularies, &c., compiled by his orders, which are now among the most precious possessions of our National Museum. Wherever rumour declared that a valuable document existed he sent scribes and messengers to take a copy, or copies, of it, and the accuracy of such copies is attested by the fact that defective or illegible words or passages in the archetype were generally indicated as such in the copy or copies made for Ashurbanipal.

The above preliminary remarks are sufficient to indicate the value of the thousands of baked clay tablets and fragments which were found at Nineveh; but it has for many years past been a problem of some magnitude to Assyriologists how best to make use of the mass of material which exists. It is manifestly impossible for every student of cuneiform to possess the time and means necessary for examining and copying texts from thousands of tablets, and besides, few students are sufficiently skilled in reading cuneiform from tablets to make it worth their while to devote months to the work.

The late Sir Henry Rawlinson made a noble attempt to lay before Assyriologists the best of the texts in his monumental publication entitled "The Cuneiform Inscriptions of Western Asia," but this work, after all, only contains a *selection* of the texts available, and at the time of publication no scholar possessed the knowledge necessary for arranging and classifying the various documents which existed among the remains of the works of the Royal Library at Nineveh. It must not be imagined

¹ "Catalogue of the Cuneiform Tablets in the Konjunkt Collection of the British Museum." By C. Bezold. 5 vols. Printed by order of the Trustees. (London, 1889–1900.)